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Integration of existing farming systems in Hadejia Valley Irrigation Project

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Abstract — Over the past three decades, the various government in Nigeria have put constant efforts in promotion and development of modern irrigation scheme, as a way to increase food production and meet an ever increasing demand. Despite all the investment put into development of large irrigation schemes, the overall performance of most of the latter have been under expectations. In the area of the Hadejia Valley Irrigation Project, other farming systems such as upland farming, fadama farming or cattle rearing activities were preexistent to irrigation farming before the inception of the irrigation scheme. In this paper, the integration of irrigation farming with other farming system will be examined. Firstly, the methodology used in data collection and analysis will be described. Then, results will be presented and discussed in order to shed some light on the integration of the farming system. Eventually conclusions will be drawn, and recommendations for performance improvement proposed.

Résumé — Intégration des systèmes de production pré-existants dans le Projet d'irrigation de la vallée de Hadejia. Depuis plusieurs décennies, le gouvernement nigérian a réalisé des efforts constants pour promouvoir et développer les grands périmètres irrigués afin d'augmenter la production et répondre à une demande alimentaire toujours croissante. Malgré les investissements réalisés pour développer ces systèmes irrigués, les résultats n'ont pas été à la hauteur des attentes dans la plupart des cas. Dans la zone du projet de promotion de l'irrigation dans la vallée de Hadejia, d'autres systèmes production existaient avant la création du périmètre irrigué (système sur terres exondées, dans les bas-fonds ou pour l'élevage). Dans cette communication, nous étudierons l'intégration de l'irrigation en relation avec ces autres systèmes. Dans un premier temps, nous décrirons la méthodologie employée pour collecter et analyser les données. Ensuite, nous présenterons et discuterons les résultats afin d'expliquer les relations entre les différents systèmes de production. Finalement, nous donnerons quelques recommandations pour améliorer les performances du périmètre irrigué.

Introduction

Over the past three decades, the various government in Nigeria have put constant efforts in promotion and development of modern irrigation scheme, as a way to increase food production and meet an ever increasing demand. Despite all the investment put into development of large irrigation schemes, the overall performance of most of the latter have been under expectations (Kaliel, 1999).

In the Hadejia Valley Irrigation Project (HVIP), since its inception in 1995, low performances of irrigation have been observed. Cropping intensities as low as 9% have been recorded (dry season 2000, Kura, 2002), pushing policy makers, financers to question issues such as returns on investment, and researchers to intend to understand the reasons for low performance.

In doing so, one needs to get a better understanding of the context in which irrigation activities are carried out. Boelens (?) points out that irrigation activities are embedded in a much broader socio-economic and agro-ecological setting that strongly shape them. In the area of the HVIP, other farming systems such as upland farming, fadama farming or cattle rearing activities were preexistent to irrigation farming before the inception of the irrigation scheme (See figure 1).

Fadama farming is a traditional cropping system along the river side, using residual moisture after flood recession or pumps to lift up the water from the river during the Dry Season, and sometimes locale rice variety during the Wet Season (flooded rice). Upland farming is practiced under rainfed conditions. The main crops grown around Hadejia area under such conditions are millet, cowpea, sorghum and beans. These grains constitute the basis of food consumption in Northern Nigeria.

In this paper, the integration of irrigation farming with other farming system will be examined. Firstly, the methodology used in data collection and analysis will be described. Then, results will be presented and discussed in order to shed some light on the integration of the farming system. Eventually conclusions will be drawn, and recommendations for performance improvement proposed.

Methodology

A qualitative survey has been carried out in the HVIP. Teams composed of one researcher and one facilitator of the Agency, using open questionnaires, have interviewed a total of 32 farmers. The questionnaires were covering the following area:
– General socio-economic data;
– Equipment and rearing;
– Land use;
– Labor Organization;
– Access to factors of production;
– Water Management.

Sampling

Qualitative sampling methods have been used. In every sector a preliminary visit (an half day per sector) has been carried out with small groups of farmers and leaders of the WUA (water users associations). It has led to a simple classification of the farmers according to their involvement in the irrigated area compared to the area under cultivation in the fadama or up-land areas or compared to the importance of different activities (cattle rearing, fishery, absentee farmers…). Results of the sampling are presented as table 1.

Table 1. Sampling of the qualitative survey.

Category of farmer	Number of respondent	Percentages in HVIP[1]
Full time farmer	16	91.5
Absentee farmer	9	6.5
Cattle herder	4	0.5
Fisherman	3	?

Some of the categories of farmers have been over-represented in the sampling, because the aim was to have a fairly good picture of the strategies and choices of every group. Hence, it was necessary to have a minimum sample size of three respondents. Besides, some of the categories (absentee farmer), because of their large land size, have an impact in the cropping pattern, which is under-reflected by their percentage.

1. Source : Ilu and al. *Baseline survey report of the Hadejia Valley Irrigation Project*, 2001.

Typology of the farmers

In analyzing the results of the qualitative survey carried out in the HVIP, it became clear that the main criterion to consider in establishing a typology of the farmers would be their main economic activity. Indeed, the strategies of the farmers and their access to the factors of production depend on this criterion. Three main categories of respondent emerged.

The "full time" farmer

They are principally characterized by the fact that farming is their main activity. They reside around the HVIP area and own the area they cultivate. Fishermen have been added to this category as their land tenure and use patterns is similar and because fishing activities do not compete with agricultural activities in term of labor availability. The difference resides in a daily steady source of income from fishing activities, however similar strategies are observed.

The absentee farmer

By absentee farmer, one refers to any respondent who does not consider farming activity (neither rearing activities) as his major source of income and/or who does not reside in the surrounding of the irrigation scheme.

The pastoralists

By pastoralist is defined any respondent who practice cattle rearing activity and considers it as its main interest. Pastoralists in the HVIP context are Fulani people.

However, it appeared that this rough typology did not reflect all the different strategies observed and that there was an important intra-group heterogeneity. By scaling down the focus of the analysis, the land size in the irrigation scheme appeared to be a relevant criterion for intra group differentiation. The final typology is presented in table 2.

Table 2. Typology of the respondent of the qualitative survey in HVIP.

Type of farmer		Land tenure in the IS
Full time farmer	Small holder	1 ac.<<10ac.
	Large holder	>10 ac.
Absentee farmer	Small scale	0<<6ac
	Large scale	>6ac
Pastoralist		-

Results and discussion

In discussing the results of the qualitative survey, the most relevant elements related to the different farming system will be analyzed. Land tenure and land use, labor organization and access to the factor of production will be examined for each of the farmer type and these results will be discussed to intend to define strategies used by each type of farmer in the articulation of the different farming systems.

Smallholder full time farmer

Most of the smallholder full time farmer own land in the three farming systems. A large majority of this type of farmers (70%) cultivates all their land during both dry and wet season, or do not do it because of technical problems (flood in G/K and Auyo). Dry season farming is considered as a very important source of income, even though it is hampered by the difficulties encountered in marketing the produce. Marketing issue is considered as a main constraint to dry season production by these farmers, especially

for tomatoes. Recent access to capital[2] has improved the possibility of the farmers to have access to inputs at the critical period between wet season harvesting and dry season crop establishment. Access to tractor hiring services is very difficult, as most of the farmers do not have timely access to them, and the scarcity is very critical[3].

The articulation between the different farming systems in terms of labor organization is depending on the season, but is the same for a large majority of the farmers. Figure 1 gives a picture of the cropping calendar during the wet season. At the inception of the rains, the farmer firstly sow in the upland area, as rainfed crops will require wet soils at the first stages of their growth.

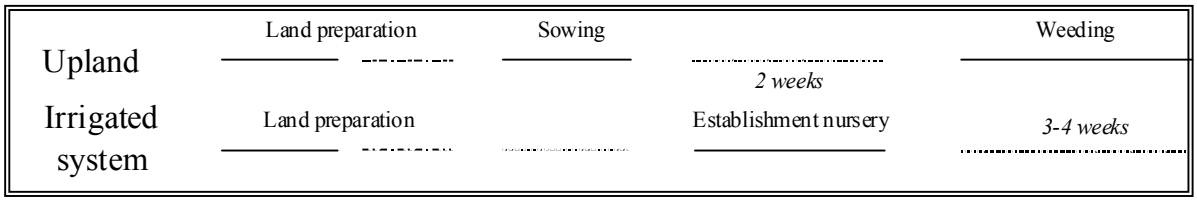

Figure 1. Cropping calendar during the wet season.

At the beginning of the dry season, the farmers firstly establish the fadama crops at the recession of the flood, as most of the fadama farmers do not own pumps and use residual moisture to grow their crops. It is only when these crops are established that they would sow in the irrigated area.

Large Holder full time farmer

The large holder full time farmers do not cultivate in the upland, but are mostly owning land in both fadama and irrigation scheme. They only cultivate a small part of their irrigated land during the Dry Season, and are mainly interested by rice cultivation during the Wet Season in the HVIP, as it is highly economically attractive. During the dry season, the land is either left fallow, or leased, to small scale full time farmer or members of the family. Labor is hired for all operations.

Small-scale absentee farmers

The majority (60%) of small-scale absentee farmers cultivate land in both the irrigation scheme and the fadama, and 40% only cultivate in the irrigation scheme. They do not own the land, but rent it, either to the HJRBDA (Government land) or to big scale absentee farmers. They are mainly civil servant or traders who are interested in having a complementary source of income. Even though some of them might cultivate some land during the dry season, efforts are concentrated in rice cultivation.

Large-scale absentee farmers

The majority of large-scale absentee own and cultivate land in both fadama and the irrigation scheme, where they have purchased at least part of it before the construction of the irrigated scheme. They do not cultivate during the dry season, leaving their land fallow, or lending part of it to family and relatives. Some of these absentee farmers equally rent land during the Wet Season, because their land size is too high for them to cultivate the totality of it. Land renting is a reliable source of income as there is a strong demand for land during the wet season[4]. By concentrating their efforts in rice cultivation, they obtain high returns and can dedicate themselves to the main activity during the rest of the year.

These farmers employ high labor force, for all operation, under the supervision of one of their family members, relatives, or an employed full time supervisor. They have easy access to tractor hiring services, or are well equipped (they own their own tractors), have easier access to cheap inputs (some of them buy them in Lagos, where the price is much lower than in the locale markets).

2. Ilu, 2002.
3. It is often observed that farmers have to seek for THS up to 200 km from the HVIP.
4. The following rates are commonly observed: DS: N.0-2000/acre (0-20 Euros/acre); WS: N.4000-5000/acre (40-50 Euros/acre).

Pastoralists

For the cattle herders, the main factors influencing the strategies are the movements of the cattle. During the dry season, at the peak of the rainfall, part of the family (the sons) leaves the irrigated area with the cattle. The reasons for this transhumance are the presence of numerous flies and mosquitoes at this time of the year, and the scarcity of grazing land (all the area is then under cultivation). The cattle comes back after harvest (November-December). During the rest of the year, cattle management occupies the whole family, and does not allow dry season farming. At this period, the household is obliged to sell rice to buy food for the cattle. Rice cultivation is then the main interest of pastoralists in the irrigated scheme, meanwhile other crops such as pigeon pea can be used for both human grain consumption and cattle feeding by the residue.

Conclusion

The strategies used by the farmers of HVIP in their production choices are complex and strongly linked to the articulation between their different agricultural and non-agricultural activities. This article proposes a typology of the farmers and analyzes the strategies of the different categories. This permits to understand the articulation between the different activities and by doing so, give some highlight on the issue of low cropping intensities. To improve dry season farming, it appears necessary to tackle the following issues.

- **Marketing**: for most of the farmers in HVIP (referred as small scale full time farmers in this article), lack of marketing opportunities is the main constraint to dry season farming. Improving market outlets, sharing timely information on prices on several markets in and around HVIP are hence necessary.
- **Operation**: Before the beginning of the wet season, there is a need to organize a negotiation platform between farmers and the agency to plan the first water release. Indeed, late water release induces the necessity for the farmers to firstly establish rain fed crops, then delaying both agricultural seasons.
- **Land tenure**: There is a clear need for the agency to improve the monitoring of land tenure and land use. This would make possible to evaluate the importance of the different farming group and to implement targeted action.
- **Access to input**: Even though access to input have been improved in the last two agricultural seasons, there is a need to continue the efforts to support a timely access to input and services, especially tractor hiring services.

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